Environmental PerspectivesOn Bioenergy



Arkansas Natural Resources Commission

J. Randy Young, P.E. ANRC Executive Director



Biofuels are liquid or gaseous products of biomass processing that can be utilized as direct or supplemental fuels.

Agricultural products specifically grown for use as biofuels include corn and soybeans.

Interest in Biofuel development has been accelerated by:

- Global increase in demand for carbon-based fuels
- Geographic concentration of known reserves
- High cost of locating and exploiting new reserves and subsequent high prices for petroleum fuels

Advantages of Biofuel

- Bioenergy is clean, domestic, renewable and sustainable
- Greater fuel supply security due to local production
- Bioenergy provides a reduction of greenhouse gases that cause global warming
- Potential for utilizing agricultural products for the production of liquid energy
- Enhancement of the agricultural economy

Energy demands are expected to grow some 50 percent in the coming decades; biofuels could supply as much as 30 percent of global demand for liquid and gaseous fuel with clear opportunities for biofuel development in Arkansas.



The prospects for biodiesel production in Arkansas are very strong. Experts suggested that the amount of biodiesel produced in 2005 would be approximately 50 million gallons, or double the 2004 levels, yet still half the current capacity.

Additionally, the American JOBS Creation Act is expected to increase the production and demand for biodiesel to as much as 124 million gallons per year.

New EPA regulations require lower sulfur content of non-road diesel fuel. Currently non-road diesel contains 3,000 ppm sulfur, which must be reduced to 500 ppm in 2007. Biodiesel mixtures may be the most cost effective strategy to achieve these criteria.

Environmental Challenges Associated with Biofuel Production in Arkansas

Marginal Land Production

- Agricultural production is risky.
- In 2005 agricultural producers across all sectors lost almost \$923 million in net farm income.
- These losses were due to cool spring weather, a prolonged drought and increasing fuel cost.

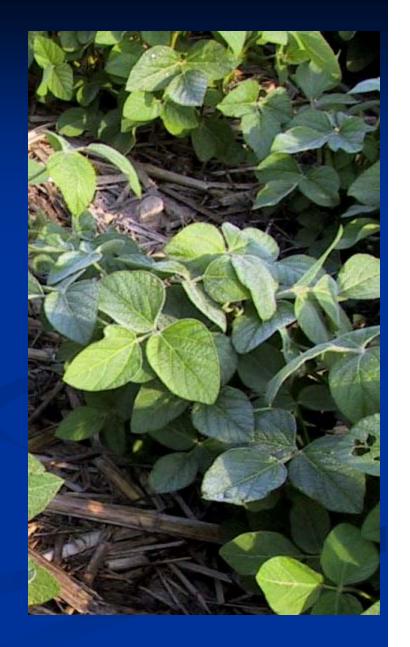
Under these economic conditions, it is reasonable to assume that opportunities for increased revenues from agricultural production could result in cultivation of marginal agricultural lands.

Water Resource Status

- Water resources in Arkansas are increasingly in short supply.
- In 2005 Arkansas farmers used 9,355,000 acrefeet of water (surface and ground) for agricultural production. Over 80 % of that was used for rice and soybeans, and another 10% for cotton.
- Withdrawal from two major aquifers (Sparta and Alluvial) in the Arkansas Delta are sustainable at approximately half the 1997 withdrawal rates.

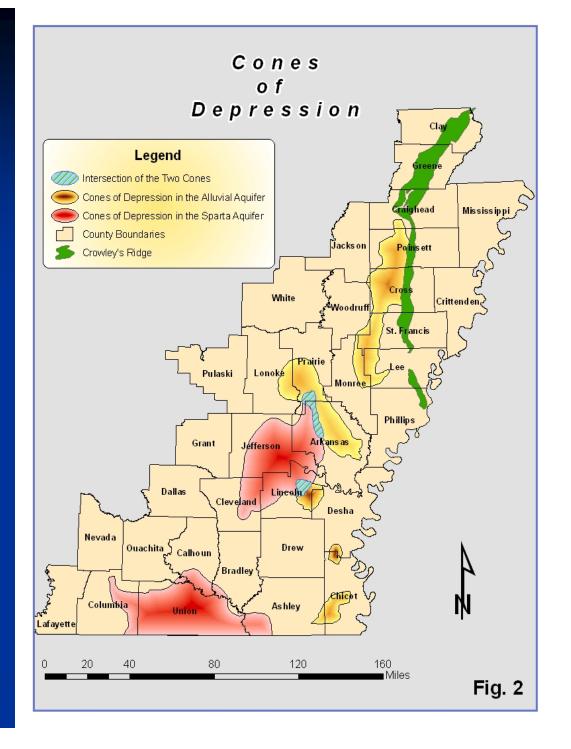
Arkansas crops with the highest short-term potential for biofuel production are soybeans for biodiesel conversion, and rice for straw and hull conversion to alcohol.

Arkansas farmers produced over 3 million acres of soybeans in 2005 with more than 2,500,000 acre-feet of water and an average yield of 34 bushels per acre.



In 2005 Arkansas farmers harvested over 1.6 million acres of rice. Arkansas production was almost 109 million hundred-weight, or 48 % of the total rice harvest in the United States in 2005. Arkansas farmers used over 5 million acre-feet of water in 2005 to irrigate rice.

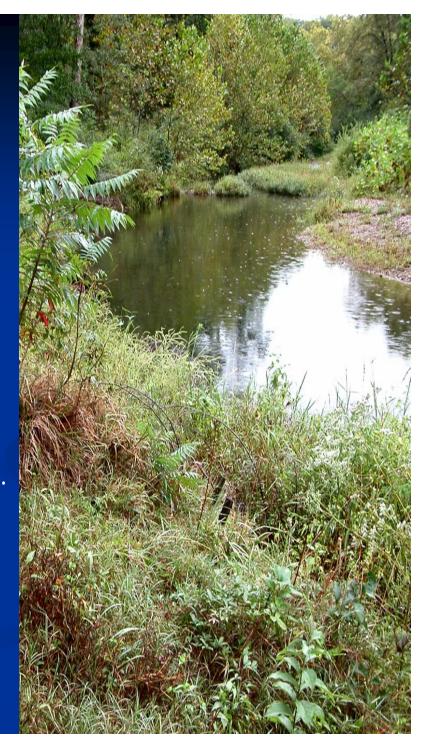
Water resources in the Arkansas Delta region are declining. ANRC estimated that withdrawals from the two major aquifers (Sparta & Alluvial) in the region are sustainable at approximately half the 1997 withdrawal rates. Water resources for crop irrigation will have to be developed and managed in order for Arkansas to meet the potential demands for biofuel production.



Potential for increased crop production to increase chemical and sediment loads to the environment

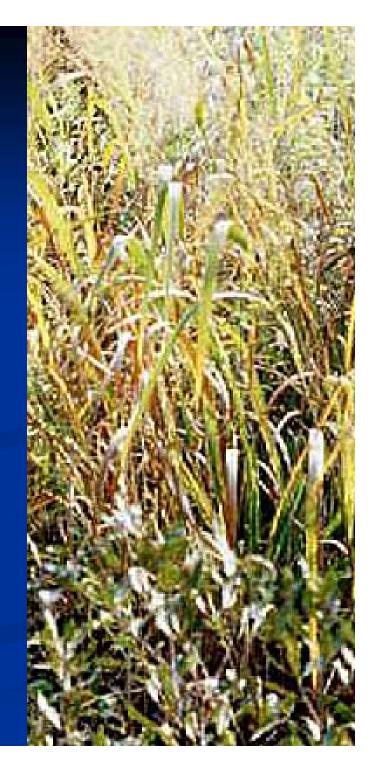
As crop production in the Arkansas Delta region intensifies, there is some potential for crop management resources (fertilizers, pesticides, soil) to enter the environment as pollutants.

Best management practices, such as streamside management zones, vegetative filter strips and riparian setbacks will become more important for water quality management.



Potential decrease in water use from conversion to perennial crops such as switchgrass

One potential impact of a biomass economy in Arkansas could be introduction of novel biomass crops such as switchgrass. Switchgrass is desirable due to its high rate of biomass production per unit area – as high as 15 tons per acre. It is a deep rooted perennial, which would reduce fuel costs for tilling, preserve soil and promote rainwater infiltration. Also switchgrass is able to produce as much as 30 % more biomass per unit water consumed.



Conclusions

- The most immediate biofuel crop in Arkansas will probably be soybeans.
- Increased soybean production, driven by higher prices, will increase the pressure to bring marginal lands into production.
- Care must be taken to ensure increased crop production does not increase chemical and sediment loads to the environment.
- The demand for irrigation water will increase, while water supplies remain static or decrease.
- Conflict over water resources will likely require increased management or regulation of surface and ground water uses to insure sustainable and equitable distribution of supplies.

Thank You

